

***What Is Claimed Is:***

1. A method of allocating a plurality of data streams to at least one physical channel in a wireless communication system, comprising:

5 grouping said plurality of data streams into a plurality of groups each comprising one or more of said data streams;

formatting each said group of data streams in packets including a group identifier uniquely identifying that group; and

10 collectively determining the allocation of each of said groups to said at least one physical channel, such that said allocation of each said group is applied to all of the data streams in said group.

2. A method as claimed in claim 1, wherein each of said data streams is formatted in packets including a data stream identifier uniquely identifying packets of that data stream.

15 3. A method as claimed in claim 1 or claim 2, wherein said grouping step comprises selecting said one or more of said data streams for each of said groups according to a predetermined Quality of Service requirement for each of said data streams.

4. A method as claimed in claim 3, wherein said Quality of Service requirement comprises a bandwidth requirement.

20 5. A method as claimed in claim 3, wherein said Quality of Service requirement comprises a sensitivity to delay requirement.

6. A method as claimed in claim 3, wherein said Quality of Service requirement comprises an encryption requirement.

7. A method as claimed in claim 1, further comprising modifying the allocation of said data streams to said groups in response to a change in said data streams.

5 8. A method as claimed in claim 1, further comprising modifying the allocation of at least one of said groups to said at least one physical channel in response to a change in said data streams.

9. A method as claimed in claim 7 or claim 8, wherein said change in said data streams comprises an increase in a bandwidth requirement for at least one of said data streams.

10 10. A method as claimed in claim 7 or claim 8, wherein said change in said data streams comprises the addition of a new data stream.

11. A method as claimed in claim 1, wherein there are a plurality of said physical channels and at least one of said groups is allocated concurrently to more than one of said physical channels.

15 12. A method as claimed in claim 1, further comprising: determining a bandwidth allocation from said at least one physical channel for each of said groups, wherein said step of collectively determining the allocation of each of said groups is performed according to the bandwidth allocation of the respective group.

20 13. A method as claimed in claim 1, further comprising buffering each of said data streams in a respective data stream buffer and, for each of said groups which has more than one data stream, multiplexing the data streams for that group by reading from the respective data stream buffers in a predetermined sequence.

14. A method as claimed in claim 13, further comprising varying said predetermined sequence in response to the level of the buffer of one or more of the data streams exceeding a threshold, so as to reduce said level below said threshold.

5 15. A method as claimed in claim 1, further comprising buffering the one or more data streams of each group in a respective group buffer, and for each said physical channel, reading data from the respective group buffer of each group allocated to that physical channel for output on that physical channel in a predetermined sequence according to the determined allocation of said group.

10 16. A method as claimed in claim 1, wherein a respective group bandwidth is allocated to each of said groups and a respective data stream bandwidth is allocated to each of said data streams, the method further comprising receiving a request to add an additional data stream with a requested bandwidth requirement, and selecting one or more of said groups for said additional data stream according to the available group bandwidth of each of said groups.

15 20 17. A method as claimed in claim 16, wherein a respective minimum data stream bandwidth is allocated to each of said data streams, further comprising, if none of the groups has an available group bandwidth sufficient for said requested bandwidth requirement, reducing the allocated data stream bandwidth of at least one of said data streams to said respective minimum data stream bandwidth, and subsequently selecting one or more of said groups for said additional data stream according to the available group bandwidth of each of said groups.

18. A method as claimed in claim 17, wherein said step of reducing the allocated bandwidth comprises selecting one of said groups and reducing the allocated data stream bandwidth of each of the data streams allocated to said selected group to the respective minimum data stream bandwidth, and the subsequent selecting step comprises determining whether the selected group subsequently has sufficient bandwidth for said requested bandwidth requirement.

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19. A method as claimed in claim 1, further comprising generating signalling information indicating the allocation of said data streams to said groups and of said groups to said physical channels, wherein one of said data streams comprises said signalling information.

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20. A method of allocating a plurality of data streams to a plurality of physical channels in a wireless communication system, comprising:

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allocating each of said data streams to at least one of said physical channels such that at least one of said data streams is allocated concurrently to more than one of said physical channels while another at least one of said data streams is allocated to only one of said physical channels.

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21. A method of multiplexing a plurality of logical channels onto a plurality of physical wireless communication channels, comprising:

continuously monitoring the collective bandwidth requirements of said logical channels; and varying the allocation of said logical channels; to said physical channels so that a minimum number of said physical channels necessary to satisfy said collective bandwidth requirements is used to carry said logical channels.

22. A method of multiplexing a plurality of logical channels onto a plurality of physical wireless channels, wherein at least one of said physical channels is of a different channel type providing a different Quality of Service from that of another one of said physical channels, the method comprising:

5                   allocating each of said logical channels to a selected one or more of said physical channels according to a Quality of Service requirement of that logical channel.

23. A method of multiplexing a plurality of logical channels onto a group of physical wireless channels, the method comprising:

10                   allocating each of said logical channels to a selected one or more of said physical wireless channels according to a Quality of Service requirement of that logical channel;

15                   varying the Quality of Service requirement of at least one of said logical channels;

20                   determining whether the varied Quality of Service requirement can be supported by said physical wireless channels, and, in response to a negative result of said determination; and

25                   adding one or more additional physical wireless channels to said group of physical wireless channels and repeating said allocating step.

24. An authentication method for determining whether to provide communication services to each of a plurality of wireless terminals, comprising:

transmitting respectively to each of said terminals a unique signalling channel assignment signal, that indicates to that terminal a duplex signalling channel uniquely assigned to that terminal;

25                   transmitting to each of said terminals in said respective signalling channel a respective authentication request signal;

receiving from each of said terminals in said respective signalling channel a respective authentication response signal, the contents of which are dependent on the contents of the authentication request signal; and

5 determining whether to provide subsequent communication services to each of said terminals according to the contents of the authentication response signal received from that terminal.

25. A method as claimed in claim 24, further including:

receiving, on a contention-based access channel, registration request signals from said wireless terminals;

10 wherein each of said unique signalling channel assignment signals is transmitted to a respective one of said terminals in response to said registration request signal from that terminal.

26. A method of authentication for a wireless communications terminal, comprising:

15 receiving a signalling channel assignment signal that indicates a duplex signalling channel uniquely assigned to that terminal;

receiving an authentication request signal on said signalling channel;

20 generating an authentication response signal on the basis of the content of said authentication request signal and identification information provided at the terminal; and

transmitting said authentication response signal.

27. A method as claimed in claim 26, further including, prior to said step of receiving a channel assignment signal,

25 transmitting, on a contention-based access channel, a registration request signal.

28. An authentication method for determining whether to provide communication services to each of a plurality of wireless terminals, comprising:

allocating to each of said terminals a respective control signalling channel with a respective Quality of Service which is variable from one said signalling channel to another; and

performing an authentication exchange with each of said terminals on the respective control signalling channels so as to determine whether to provide services to that terminal.

29. A method as claimed in claim 28, further comprising:

allocating to each of said one or more terminals at least one service channel for carrying service communications, wherein the Quality of Service of said at least one service channel is independent of the Quality of Service of the respective control signalling channel.

30. Apparatus arranged to perform the method as claimed in any one of claims 1, 2, 7, 8, and 11 to 23.

31. A satellite earth station comprising the apparatus as claimed in claim 30.

32. Software arranged to perform the method as claimed in any one of claims 1, 2, 7, 8 and 11 to 23 when executed by a processor.